

UNITED STATES PATENT AND TRADEMARK OFFICE

In application of

Bruce Lawence John Murray, William Nevil Heaton Johnson

Filed concurrently herewith

Title: Security and Authentication Marking of Products

--- oOo ---

Pittsburgh, Pennsylvania 15237
January 23, 2004

Mail Stop Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Sir:

1. (Original) A system for security marking a product, in which a surface of the product is covered by a layer of light-transmitting material which exhibits variations in refractive index throughout the material such that for most angles of view the material acts as a conventional diffuser of light and thereby conceals or obscures a marking applied to a surface of the product and covered by said layer, or conceals or obscures a marking incorporated in said layer, but for a critical angle of view, or a limited range of angles close to that critical angle, the layer is effectively transparent allowing unimpeded viewing of the marking.

2. (Original) A system according to Claim 1 in which the marking is itself constituted by refractive index variations within the layer, such that for most angles of view, the graded refractive index layer presents the appearance of a uniform light-diffusing coating.

3. (Amended) A system according to claim 1 ~~or claim 2~~ wherein said layer of light transmitting material has been formed by exposing a photopolymerisable material to polymerising radiation.

4. (Original) A security or authentication marking which comprises an opaque marking, for example printed on the article concerned, and an overlying layer or coating of a graded refractive index material, the latter being so arranged that when the marked surface of the article is viewed, from most angles of view the overlying layer or coating is effectively opaque as a result of its light-diffusing properties, and thus conceals the printed marking, but is transparent from the critical angle of view, so that the printed marking can be viewed through the overlying coating.

5. (Original) A product having a security or authentication marking, and wherein the product comprises a layer or coating of a graded refractive index material and in which the security or authentication marking is incorporated in the graded refractive index material itself, for example, by arranging that selected regions of the material are light-diffusing, and are substantially opaque at all angles of view, or are transparent from a different angle of view from the angle of view for which the remainder of the graded refractive index material becomes transparent, so that they become visible at the critical angle of view for which the remainder of the material becomes transparent.

6. (Original) A marking system according to ~~any preceding~~ claim 5 in which, instead of processing the material so that light pipes are created within the volume of the material, Lippmann layers are created using laser light so that the marking is composed of highly reflective coloured dots.

7. (Original) A method of providing a security marking on a product, comprising applying to the product a coating of a photopolymerisable material and causing said material to polymerise, by appropriate exposure to appropriate collimated radiation, (e.g. collimated ultraviolet light), at a predetermined angle, to establish refractive index variations within the layer, such that for most angles of view, the graded refractive index layer presents the appearance of a uniform light-diffusing coating, but for a critical angle of view, or a limited range of angles close to that critical angle, the layer is effectively transparent allowing unimpeded viewing of the marking.